

THE RADICAL CURE OF SEVERE FEMORAL AND INGUINAL HERNIA.

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THE method of operating here dealt with is applicable to both femoral and inguinal hernia. Its main features are:

(a) The employment of the sac to form an intra-abdominal buttress over the internal aspect of the hernial opening or ring; (b) the use of the pubic ramus as a *point d'appui* in the process of closure of the hernial canal, and (c) the additional security of closure obtained by the superposition on the bone sutures of a plane of fascial sutures.

Its application to femoral hernia was described in the *British Medical Journal* of November 8, 1902, with a modification described in the *Scottish Medical and Surgical Journal* of December, 1903. Its employment in inguinal hernia was described briefly in 1905, and is here published for the first time *in extenso*.

It is not a difficult operation, and whatever extra work is involved in the drilling of the bone is compensated for in the firm closure secured in the hernial canal. In looking to results obtained, it is necessary to differentiate in the cases treated as between cases not specially severe, on the one hand, and severe cases on the other. In ordinary cases the method gives results as good as, but no better than, many of the methods in use. In severe cases, cases of large hernial aperture, of lax and atrophic parietes, or high intra-abdominal tension from omental corpulence, the method, with its double closure of the canal by bone suture, followed by musculofascial suture, attains a high degree of security. In femoral hernia I have of late employed the method in practically all cases, though at first designing it for severe cases only. In inguinal hernia I

have as yet made use of it only in severe cases, finding other and simpler methods answer for ordinary cases.

Femoral Hernia.—Of formal operations for femoral hernia there are many. The simpler operations include the "purse-string" suture of Cushing, Fortunato,¹ Curtis,² and others, popularized by Coley,³ the well-known operation of Kocher, and the more or less similar suture operations of Bassini,⁴ Franz,⁵ Fabricius,⁶ Bottini,⁷ and others. What may be termed "flap" operations comprise the osteoperiosteal flaps of Trendelenburg and Kraske,⁸ the musculofascial (pectineal) flaps of Watson Cheyne,⁹ Saltzer,¹⁰ Prokudin,¹¹ and others, and the adductor longus flap of Schwartz.¹² Operations by approach from above include intra-abdominal closure of the ring by laparotomy, and by way of the inguinal region (Ruggi,¹³ Nasi,¹⁴ Parlavacchio,¹⁵ and Tuffier). With these last may be included closure of the femoral canal by the employment of the fascia transversalis (Buonamici),¹⁶ and the method of Lotheissen,¹⁷ or (*vide* Kammerer¹⁸) the Lotheissen-Gordon¹⁹ method, in which the conjoint tendon of the internal oblique and transversalis is attached to Cooper's ligament.

The following is the technique of the operation I employ:

A. *Obliteration of the sac*, also of the peritoneal depression over the abdominal aspect of the ring, and the substitution of a buttress over the internal aspect of the ring:

1. Expose the sac, and clear it from surrounding tissues (the skin incision may be vertical or transverse).
2. Open the sac longitudinally in its middle line, and clear of contents.
3. Separate it from parts surrounding its neck, including the transversalis and the iliac fasciæ for one inch round the abdominal aspect of the ring.
4. Bisect the sac longitudinally from fundus to neck (Fig. 1).
5. Make an aperture in one half near the neck (Fig. 1).
6. Interlock the halves by putting the other through the aperture (Fig. 2). In certain cases it lies better if previously twisted one half-turn on its longitudinal axis.

7. Reduce the whole sac through the femoral ring into the extraperitoneal space previously cleared for it by detaching its neck from the abdominal aspect of the ring. The sac thus lies bunched up within the abdomen, between the peritoneum and the transversalis and iliac fasciæ over the internal aperture of the femoral canal.

Where the sac is unnecessarily large, part of it may be cut away before reducing it through the canal.

B. Closure of the *Femoral Ring*:

1. Carry an incision (bone-deep) from the femoral vein along the pubic ramus to the region of the pubic spine. This

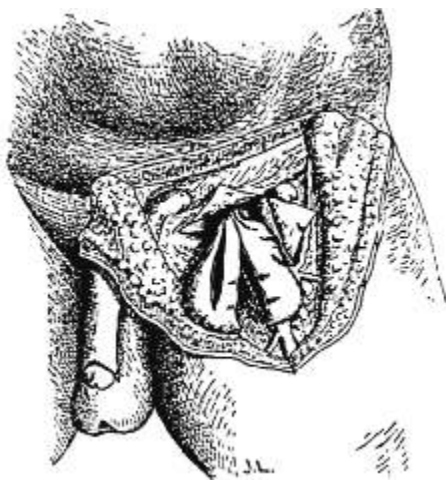


FIG. 1.—Sac emptied, detached from surrounding parts, including internal aspect of abdominal wall for one inch round femoral ring; split longitudinally, and one half incised for passage of the other.

divides the pubic portion of the fascia lata, the origin of the pectineus, and the periosteum. Its length will depend on the extent to which the femoral vein has been displaced outward by the presence of the hernia, and will vary from one inch to one inch and a half.

2. Detach the periosteum to a limited extent, and retract it.

3. Drill the bone near its upper edge in two places one-half inch to one inch apart (one drill-hole may be made to suffice). Any bone drill or punch may be used. In the illustration (Fig. 3), the simple hand drill and the tongue depressor used as a protecting spatula are those I commonly employ.

4. Pass through one of the apertures a loop of stout catgut, or other absorbable ligature (Fig. 3). This may be passed by threading it in the eye of a curved surgical needle, or by

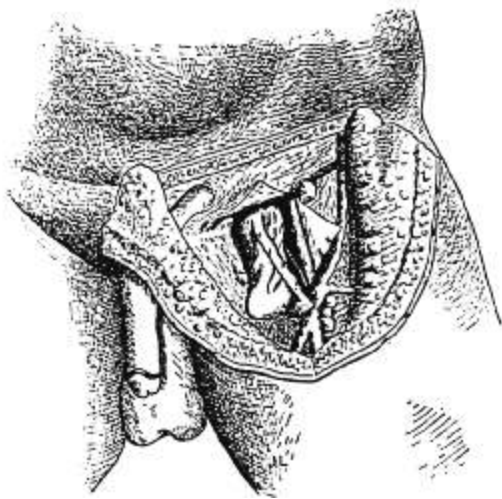


FIG. 2.—Sac ready for reduction, with halves interlocked. (The situation of the aperture in the sac in Figs. 1 and 2, and the relative positions of the two halves of the sac in Fig. 2 are not, in the interests of semidiagrammatic clearness in the drawings, quite those of actual practice.)

pushing it through, simply doubled on itself. It is, however, more easily passed by threading it in the eye of the bone drill or in the eye of an ordinary surgical probe. For the purpose, I employ a special probe in which the eye is small and placed very near the extremity of the handle (Fig. 4). The advantage of that shape and position of the eye will be obvious to

those familiar with drills for wiring fractures, or to any one in his first performance of this operation. With such a probe the operation is of the simplest; without it, some difficulty may be experienced in passing the suture through the aperture. The probe should be of the ordinary pliable type.

5. Divide the loop of ligature. Thread one end in a large curved surgical needle and pass it as a mattress suture through Poupart's ligament. Unthread it from the needle (Fig. 4).

Repeat this with the second end, carrying it through Pou-

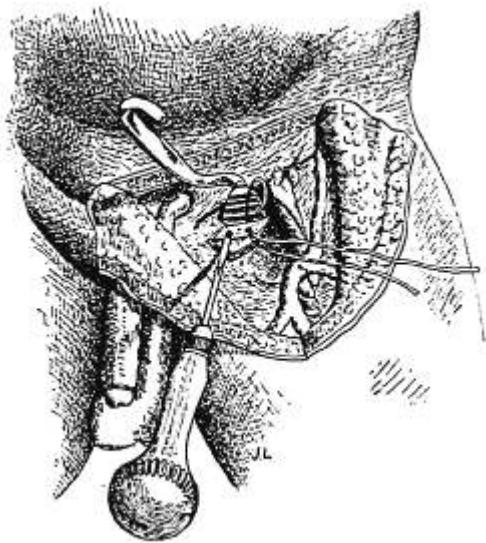


FIG. 3.—Closure of ring; drilling of bone; looped catgut suture passed through first drill-hole.

part's ligament at a higher level (Fig. 4), avoiding the deep epigastric artery to the outer side, and, in male patients, the spermatic cord above. (In very large herniæ, the loops, instead of being placed the one directly above the level of the other, as figured, may be made to diverge in the ligament so as to "gather in" the margin of the aperture.)

6. By means of the probe (into the eye of which the ends

are threaded) withdraw both ligatures through the second drill hole in the bone (Fig. 4). It is in this part of the operation that the special probe is of particular advantage, even if the common device of the loop tractor indicated in Fig. 9 be adopted.

7. Tie the ends of each loop separately over the front of the bone, thus bringing Poupart's ligament down to the posterosuperior surface of the bone and fixing it firmly in contact with that surface, constituting what is in effect an extension

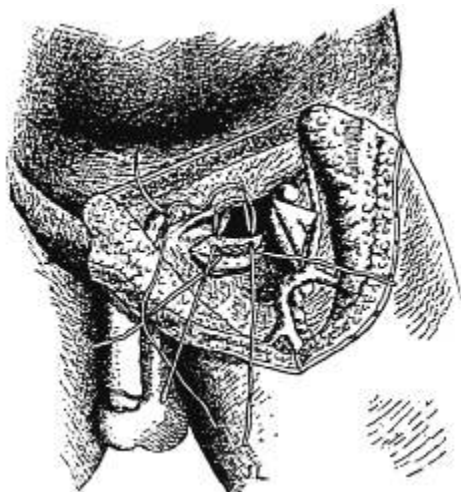


FIG. 4.—Closure of ring; placing of the loops in Poupart's ligament, and return of the ends through second drill-hole. (One loop tied loosely to indicate action in pulling Poupart's ligament down to posterosuperior aspect of ramus of os pubis.)

outward of Gimbernat's ligament, and absolutely closing the femoral ring to whatever extent may be desired, due regard being paid to the amenity of the femoral vein. The degree of occlusion is regulated by the position of the sutures in Poupart's ligament, but not by the tension with which they are tied. This latter does not vary, the knots being tied in all cases firmly to bring the ligament into contact with the bone (Figs. 4 and 5).

8. To make the closure doubly secure, complete the operation by uniting, by interrupted catgut sutures, the detached margin of the pectineal origin and the pubic portion of the fascia lata to the "anchored" Poupart's ligament (Fig. 5).

REMARKS ON THE FOREGOING DESCRIPTION OF THE
FEMORAL OPERATION.

Method of Treating the Sac.—The manœuvre of returning the emptied sac through the canal of a hernia is not new. While descriptions of such operations may be found far back

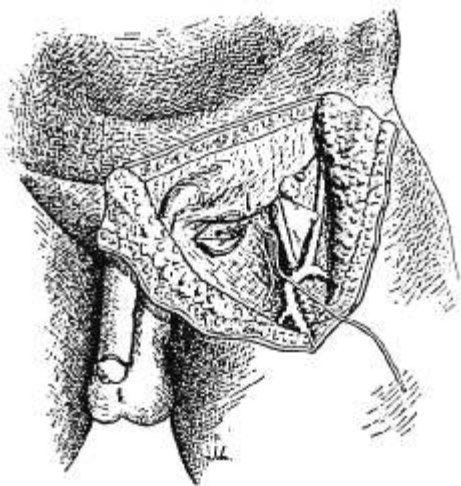


FIG. 5.—Closure of ring; bone sutures tied; completion of closure by suture of fascia lata and pectineus to the fixed Poupart's ligament.

in surgical records, the practice was first put upon a formal footing by Sir William Macewen, and to his advocacy is due the general recognition of the great value of the buttress formed over the abdominal aspect of the ring by the puckered-up sac. Macewen, as is well known, puckers up the sac by a "gathering" suture which, passed through the hernial canal and out through the parietes, is made the means of puckering up the sac on the abdominal aspect of the ring. Variations of

the technique by which Macewen's object is attained have been introduced by other surgeons (*vide*, for example, the operations of Davis²⁰ and Packard,²¹ and the method described above is but one of these variations.

The Absence of All Sutures in the Sac has Three Advantages:

1. The obvious saving of time.
2. Avoidance of the recognized risk of strangulation, and consequent sloughing, of the puckered-up sac in the grasp of the ligature.
3. The facility with which the entire sac may be placed within the abdomen. A suture emerging from the neck of a large sac may, while pulling the neck within the abdomen, by anchoring it to the parietes leave the bulky fundus blocked in the canal. The absence of a suture permits the interlocked sac to be pushed as far within the abdomen as may be desired.

Against these advantages there is to be placed, I believe, one disadvantage, and that a minor one, involved in the absence of suture, namely, that the fixing of the sac in position depends on the tying of the sutures closing the ring, and not upon a special sac suture, and that, therefore, it is necessary, particularly in cases where the patient has "strained" between the placing of the sac and the tying of the ring sutures, to verify and, if need be, adjust the position of the sac before tying the sutures closing the ring. Once tied, these sutures close the ring absolutely, and no prolapse of the sac into the canal is possible. In femoral hernia I have never seen any tendency of the sac to prolapse before closure of the ring, but I have seen it in several cases of inguinal hernia. The explanation may lie in the fact that the inguinal rings are more freely affected by "straining" or deep respiration than is the femoral.

Method of Closure of the Femoral Aperture.—In the first description given of the operation (Glasgow Pathological and Clinical Society, April 14, 1902), I stated that, in looking into the literature of the subject, I found that Roux²² had also been carrying out in the closure of the ring the idea of

attaching Poupart's ligament to the bone, though employing a different method to attain that end, namely, the use of a U-shaped metal nail driven through the ligament into the bone; and that it was somewhat surprising that a further search (so far as the regrettable decease of the invaluable *Index Medicus* permitted such to be made) should have revealed no other references to the utilization of so conveniently placed a *point d'appui* as is offered by the pubic ramus for the closure of the femoral ring on the classic principle of restoring its boundaries to their correct, or to an over-corrected, position.

The method of closing the ring above described, and which I had been practising for some time before I learned of Roux's independent work, is, in my probably too partial opinion, preferable to that adopted by Roux, for the following reasons:

1. Roux's operation involves the introduction of a metal foreign body. The subsequent removal of this, if desired, involves a second operation, with the risk of detaching the ligament from the bone in withdrawing the nail. Its permanent retention, on the other hand, involves the chance of the loosening of the nail by absorption (possibly necrosis) of the bone, as occurs not infrequently with wire sutures in fractures. Should this occur, and the nail become dislodged from the bone by the natural pull of Poupart's ligament or otherwise, a state of matters is established in which every movement of the thigh or abdomen would menace the femoral vessels and the peritoneum with puncture by the points of the nail.

2. The method of suture employed in the operation I have described brings Poupart's ligament down to the posterosuperior surface of the bone, attaching it there in the region of the ileopectineal line on the plane of Gimbernat's ligament, constituting virtually an artificial extension of that ligament. The effect of such an attachment, as a study of the anatomy of the region will show, is to occlude the femoral aperture at its extreme upper (inner) end (the plane of Gimbernat's liga-

ment), thus shutting its mouth, instead of closing its throat as the attachment of Poupart's ligament to the superior or anterosuperior surface of the bone does.

3. By varying the position of the two mattress loops of ligature, or by making them diverge, in Poupart's ligament, it is easy to effectually close the largest femoral ring without exerting pressure on the femoral vein. The tension of the femoral sheath may be regulated with precision.

4. Roux's nail attaches Poupart's ligament to the peri-

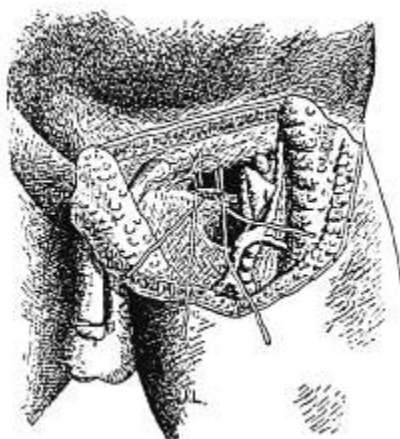


FIG. 6.—Modification of femoral operation. Anterior lip of periosteal incision raised in the form of a short periosteal flap through which the sutures have been passed.

osteum. The operation above described attaches it independently to both bone and periosteum.

5. The second plane of (musculofascial) sutures affords an additional security in the closure which Roux's operation does not possess.

Modification of Operation.—The following modification is not intended as a regular substitute for the second part of the operation, the closure of the femoral canal. In effect it is less secure. It affords the means, however, of attaching

Poupart's ligament in the desired position in cases where the operator is not supplied with a drill, as when hurriedly called to operate in a case of strangulation.

The sac having been reduced into the abdomen, and Poupart's ligament pushed back with a spatula, an incision is carried along the posterosuperior aspect of the pubic ramus from the femoral vein to the pubic spine (or part of that distance). This divides the periosteum. Its anterior lip is then raised to a slight extent by any convenient elevator, such as

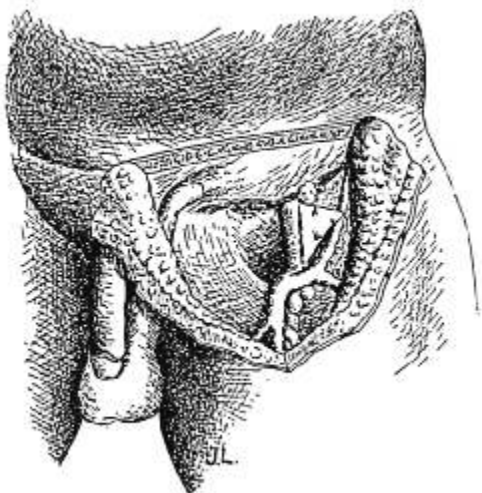


FIG. 7.—Modification of femoral operation. Suture knots tied on anterior (outer) aspect of anterior lip of periosteal incision, thus lodging the free margin of Poupart's ligament in the periosteal incision.

N. B.—In Figs. 6 and 7 the periosteal lip or flap is necessarily represented as raised too extensively, and, therefore, too long.

the flat end of an ordinary probe bent to a suitable angle or the blade of a pair of curved scissors. The effect of this is to form a short periosteofascial flap, the size of which has, for the purposes of illustration, been exaggerated in Fig. 6.

With an ordinary curved surgical needle the catgut suture is carried through Poupart's ligament, divided, and the ends,

again threaded in the needle, successively passed into the periosteal incision and out again through its anterior lip (Fig. 6). The tying of these ends lodges the free margin of Poupart's ligament in the periosteal incision on the posterosuperior aspect of the bone, thus closing the canal (Fig. 7).

As already mentioned, the closure thus obtained is less secure than that resulting from the bone suture method. Further, if the periosteal incision be made too long, or the anterior lip be raised as far as it, necessarily, has been in the illustrations, the result will be the attachment of Poupart's ligament, not to the posterosuperior, but to the superior surface of the bone, a much less efficient attachment.

Inguinal Hernia.—As applied to inguinal hernia, the method, as stated above, has in cases of ordinary severity probably no advantages over any of the many other methods in use. In severe cases, however, the combination of internal buttress, bone sutures, and superimposed musculofascial sutures involved in the method secures a closure of the aperture more absolute than can *in such cases* be secured by probably any other method. For it must be recollected that in practically all the known methods of operating for inguinal hernia, the *point d'appui*, whether the sutures are carried through the structure itself, or through other structures attached to it, is Poupart's ligament. The old, large, "severe" inguinal hernia rests on a Poupart's ligament which has stretched into a thin lax band sagging loose in a downward curve between its points of support at pubic crest and iliac spine. What in its normal condition constitutes an efficient fixed support on which the closure of the canal may be securely made, becomes, when stretched in an old severe hernia, considerably less efficient for the purpose. One of the main ideas concerned in the application of this method to inguinal hernia is to reinforce in such cases the defective Poupart's ligament by the backing of the pubic ramus.

The technique of the operation in inguinal hernia is as follows:

A. *Obliteration of Sac, and Formation of Intra-abdomi-*

nal buttress.—The treatment and final bestowal of the sac are carried out as in femoral hernia, and the terms of the description given in that case may, *mutatis mutandis*, be applied to inguinal hernia (Fig. 8), the sac being lodged over the internal aspect of the internal inguinal ring as a pad resting between the parietal peritoneum, on the one hand, and the fascia transversalis on the other.

B. Closure of the Inguinal Canal:

1. With blunt retractors pull the spermatic cord (or round

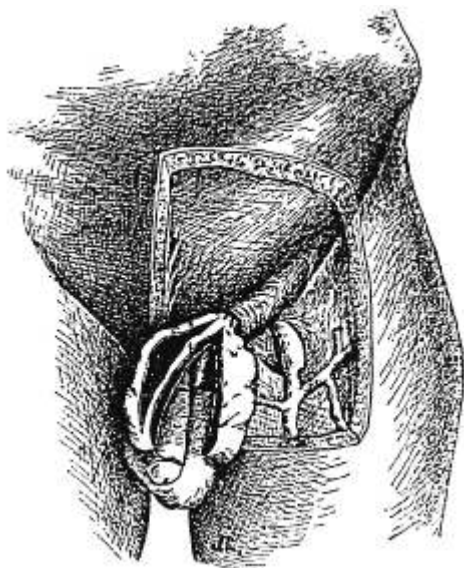


FIG. 8.—Sac emptied, detached from surroundings, bisected, and incised for interlocking and reduction.

ligament) upward and Poupart's ligament downward. The lax condition of the latter in cases of severe hernia permits free retraction, affording space not indicated in a dissection of the normal region.

2. Carry an incision along the superior aspect of the pubic ramus. This divides the iliac fascia, the origin of the

pectineus, and the periosteum. Its limits are the pubic spine and of the femoral sheath.

3. Slightly detach both margins of the periosteal wound.

4. Drill the bone, near its upper margin, in two places, one-half to one inch apart. The drill-holes are situated somewhere between the pubic spine and the femoral sheath, their exact position varying with the shape and size of the hernial aperture. The drill may be applied to the bone above the level

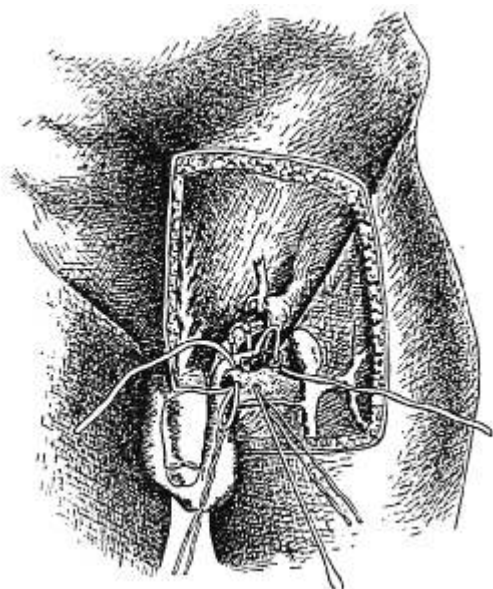


FIG. 9.—Closure of canal; bone drilled; mattress suture placed in internal pillar, and withdrawn through drill-holes by probe and loop-tractor.

of the retracted Poupart's ligament, in cases in which that is sufficiently lax to afford the necessary room for passing the drill *transversely* through the bone. In cases in which that is not so the drill should be applied to the anterior surface of the bone below the level of Poupart's ligament, and, in consequence, after perforating the pubic portion of the fascia lata.

Transverse perforation of the bone is essential. Oblique perforation places the internal apertures of the drill-holes far down on the posterior aspect of the bone, and more or less inaccessible. (*Vide*, also the position of the ligature knots, as described below.)

5. Pass a stout absorbable ligature, in the form of a large mattress suture, through the internal pillar of the hernial aperture. It is essential that this should have a "good bite" of the conjoined tendon and of the fascia transversalis (Fig. 9). It may or may not include the external oblique. During

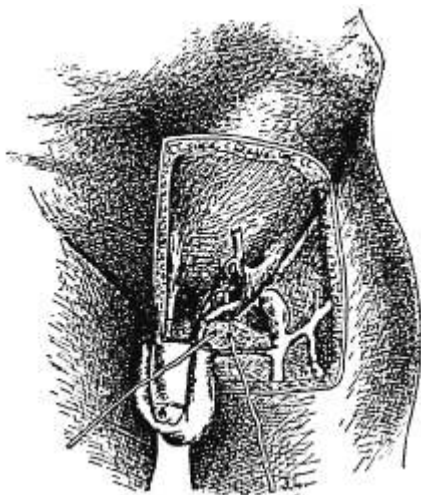


FIG. 10.—Closure of canal; suture, traversing internal pillar, and drill-holes in bone, ready for tying. The suture, here represented single, is commonly used double, each loop being tied separately.

the placing of the suture, the peritoneum is protected by the finger passed through the canal into the extraperitoneal fat behind the internal pillar. While indicated in the illustrations as single, the ligature should be double (*vide* Figs. 3 and 4), the loops being placed one above the other.

6. Pass the ends of the sutures out through the holes drilled in the bone. Of various methods of doing this, the

most expeditious are either the special probe indicated or the loop tractor (Fig. 9).

The sutures may pass in front of the spermatic cord or behind it (Fig. 10), as may seem best to secure firm closure of the canal without undue compression of the cord. In the event, the cord will occupy in the former procedure the position of the direct inguinal hernia, in the latter that of the oblique variety.

7. Tie the ends of the two loops of ligature separately.

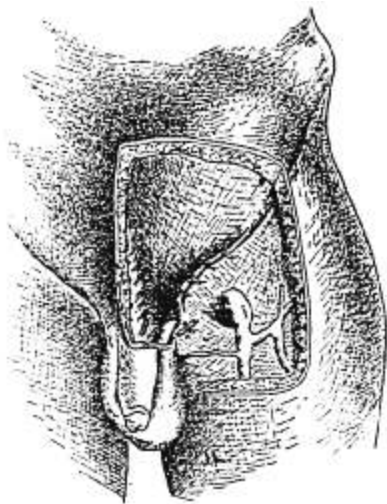


FIG. 11.—Closure of canal. Poupart's ligament sutured to the internal inguinal pillar.

The tightening of the knots brings the internal pillar down into the periosteal incision and lodges it firmly against the bone.

The position of the knots may vary. In Figs. 9 and 10 the ends of the suture, after having been passed out through the drill-holes in the bone, have been carried from within outward through the pubic portion of the fascia lata below the level of Poupart's ligament, and (Fig. 11, x) tied there, on

the external surface of the fascia. Or the suture ends, after traversing the bone, may be tied above the level of Poupart's ligament (Fig. 12), the knots lying between Poupart's ligament and the bone, or even between the periosteum and the bone, though the latter position is not free from objection on account of the risk of interfering unnecessarily with the vitality of the bone. The same choice of position, above or below Poupart's ligament, applies to the direction of the drill in making the perforations in the bone (which see). The factor in the choice of the position of both drill and ligature knots is the degree of relaxation which has occurred in Poupart's ligament.

The knots should in all cases be tied firmly to lodge the internal pillar against the bone. Here the amenity of the spermatic cord is efficiently protected, as is that of the femoral vein in the femoral operation, by adjusting the position and size of the loops of suture in the internal pillar, and not by varying the tension of the knots. Should threatened compression of cord (or vein) necessitate the "replacing" of the loops, time may be saved by dividing each loop above the bone and retaining the ends as tractors for the passage of the new sutures.

8. Complete the operation by lifting the lax Poupart's ligament to the anterior surface of the internal pillar, and fixing it there by interrupted sutures which should be of stout catgut, or other absorbable material, and should penetrate at least the external and internal oblique muscles. This final step in the operation is, obviously, one made possible solely by the lax condition of Poupart's ligament. It is difficult in small herniæ, impossible in the normal cadaver, and not easy to depict by pencil, however skilled (Fig. 11).

Modification of Operation.—As in femoral hernia, the method may be modified in cases where the operator finds himself unprovided with a drill. The anterior lip of the periosteal incision is a stout structure, comprising, in addition to the periosteum, the iliac fascia and the origin of the pectineus. This lip is to be slightly raised, and the ends of the suture

carried through it from within outward (Fig. 12) and tied there. The knot may lie above or below the level of Poupart's ligament (see remarks above). The operation is finished by suturing Poupart's ligament to the anterior surface of the internal pillar as described above (Fig. 11). The closure obtained by the modified operation is less secure than where bone suture is employed, but has been found efficient.

Remarks on the Foregoing Description of the Inguinal Operation.—It may be well to disarm criticism by repeating

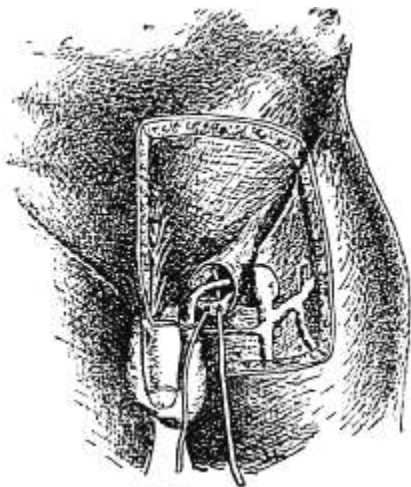


FIG. 12.—Modification of inguinal operation. Anterior lip of periosteal incision raised in the form of a short periosteofascial flap through which the sutures have been passed.

that this method of operating appears to have less *raison d'être* in inguinal than in femoral hernia, and has been employed for "severe" cases only. Further, it is to be noted that the method involves three distinct procedures in combination, and that the modification above described in the second procedure (the use of the anterior lip of the periosteal incision) comes near to trenching on known ground, while the third procedure (the suturing of Poupart's ligament to the internal pillar) is com-

mon to the majority of recognized operations for the radical cure of inguinal hernia.

To the skill and kindness of Dr. John Lindsay, of Glasgow, I am indebted for the sketches which form the illustrations.

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